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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,049	02/13/2006	Nicola Da Dalt	1435.128.101/12928US	4105
25781 7590 02/26/2009 DICKE, BILLIG & CZAJA FIFTH STREET TOWERS 100 SOUTH FIFTH STREET, SUITE 2250 MINNEAPOLIS, MN 55402				
EXAMINER				
GANNON, LEVI				
ART UNIT		PAPER NUMBER		
2817				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/541,049

Examiner

LEVI GANNON

Applicant(s)

DA DALY, NICOLA

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2009.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-19, 22, 23, 25 and 29-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-19, 22, 23, 25 and 29-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-540)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/02/09 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 17, 19, 22, 25, 29, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Duff (GB 2 002 157; reference of record).

Regarding claim 17, Duff discloses a device (figure 2) for frequency synthesis comprising: an oscillator (11,30) driven for generating, at a frequency out of a set of at least two possible output frequencies (frequencies can be: frequency found at "IN" node, a divided frequency from 1 lb, or zero), an output signal (OUT); and a control device (20) for driving the oscillator (11,30), wherein the control device, for the purpose

of generating a desired frequency that is not included in the set of possible output frequencies (by providing an average frequency), is configured to drive the oscillator to alternately generate at least two different output frequencies (frequencies can be: frequency found at "IN" node, a divided frequency from 1 lb, or zero), out of the set of possible output frequencies, such that an average value of the generated output frequencies over a certain time period is the desired frequency (note abstract) plus or minus a relative frequency error (A relative frequency error will inherently be present because no circuitry can be designed operate perfectly.), wherein the control device is configured to drive the oscillator such that the at least two generated output frequencies are alternated at a selected average switching frequency that is less than the at least two possible output frequencies (Switches 35/37, and 36/37 can be switched at any desired speed, specification page 2, lines 104-110.); and a frequency divider (11k) connected to the output (output of 11c) of the oscillator and configured to reduce the relative frequency error generated at the selected average switching frequency (The divider 11k is connected to the output of the oscillator of Duff exactly how the divider and oscillator in the instant application are connected. Due to the structural similarities between the device of Duff and the instant application, the frequency divider of Duff will inherently provide the same function as the frequency divider in the instant application.), wherein the selected average switching frequency is selected to be smaller than a switching frequency necessary to obtain a desired relative frequency error without the frequency divider (This limitation is created due to averaging effects of the frequency divider. See top of page 7 of Applicant's remarks. The frequency divider 11k of Duff

provides similar averaging effects to those provided by the frequency divider in the instant application, so the frequency divider inherently provides this function regarding the relationship between average switching frequency and relative frequency error.).

As for claim 19, Duff teaches the control device (20) being configured to drive the oscillator such that the at least two generated output frequencies are alternated at an average switching frequency that is greater than the reciprocal value of the certain time period. (Switches 35/37 and 36/37 can be switched at any desired speed, specification page 2, lines 104-110.)

In terms of claims 22 and 25, Duff teaches the oscillator comprising a digitally controlled oscillator. Switching device part of oscillator (11, 30) contains digital devices 35-37.

Regarding claims 29 and 31, the methods as recited in the claims are inherently present in the structure as discussed above in the rejections of claims 17 and 19.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirotoimi (European Patent Application 0 430 493; reference of record) in view of Dietl et al. (hereinafter "Dietl") (US Patent 6,556,088; reference of record).

As for claim 17, Hirotoimi discloses a device (figure 7) for frequency synthesis comprising: an oscillator (inside dotted line box) driven for generating, at a frequency out of a set of at least two possible output frequencies (by adjusting current provided to delay stages seen in figure 7), an output signal; and a control device (701/702 and transistor providing current) for driving the oscillator, wherein the control device, for the purpose of generating a desired frequency that is not included in the set of possible output frequencies (note column 1, lines 5-10), is configured to drive the oscillator to alternately generate at least two different output frequencies, out of the set of possible output frequencies, such that an average value of the generated output frequencies over a certain time period is the desired frequency (Adjusting the current fed to the oscillator through the transistor is adjusted by adjusting the variable resistors 701 and 702. The output frequency of the oscillator is then changed by way of a varying control current.) plus or minus a relative frequency error (A relative frequency error will inherently be present because no circuitry can be designed operate perfectly.), wherein the control device is configured to drive the oscillator such that the at least two generated output frequencies are alternated at an average frequency that is less than the at least two possible output frequencies (The resistors 701 and 702 may be adjusted at any frequency relative to the output frequency of the oscillator.).

Hirotoimi does not teach a frequency divider connected to the output of the oscillator and configured to reduce the relative frequency error generated at the selected average switching frequency, wherein the selected average switching frequency generated is selected to be smaller than a switching frequency necessary to obtain a desired relative frequency error without the frequency divider.

However, one well known application of ring oscillators to those of ordinary skill in the art includes placing a ring oscillator in phase locked loop; wherein the phase locked loop includes a frequency divider connected to the output of the ring oscillator. One well known example is taught by Dietl; wherein the output of a ring oscillator (16 in figure 1; detailed in figure 2) is provided to a frequency divider (18) in a phase locked loop system (figure 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to place the ring oscillator of Hirotoimi into a phase locked loop; wherein the phase locked loop includes a frequency divider connected to the output of the ring oscillator because such a modification would have been making use of a well known application of ring oscillators to those of ordinary skill in the art. Note: Placing a frequency divider at the output of the oscillator of Hirotoimi (as shown in figure 1 of Dietl) would be similar to the structure taught in the instant application. Due to the structural similarities between the modified device of Hirotoimi and the instant application, the frequency divider of Hirotoimi will inherently provide the same function as the frequency divider in the instant application.

As for claim 23, Hirotoimi teaches the oscillator comprises a ring oscillator (note ring oscillator in figure 7), wherein a current (from transistor shown), out of a set of possible currents (provided by changing values of resistors 701 and 702), can be supplied to the ring oscillator for the purpose of driving the ring oscillator (current inherently is driving the ring oscillator of Hirotoimi).

Claims 18 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duff in view of Kamas et al (hereinafter "Kamas") (US Patent 6,429,799; reference of record).

In terms of claim 18, Duff teaches the control device (20) operating in an analog to digital conversion principle but fails to teach the control device driving the oscillator with a bit stream generated according to a delta-sigma-principle.

Kamas teaches the delta sigma principle being a well known form of analog to digital conversion. Note column 1, lines 61-63.

It would have been obvious to one of ordinary skill in the art to drive the oscillator with a control device according to the delta sigma principle because such a modification would have been an addition of a well known analog to digital conversion circuit.

Regarding claim 30, the method as recited in the claim is inherently present in the structure as discussed above in the rejection of claim 18.

Response to Arguments

Applicant's arguments filed 02/02/09 have been fully considered but they are not persuasive.

Regarding Applicant's comments directed to the rejection of claims 17 and 29 under 35 U.S.C. 102(b) as being anticipated by Duff, Applicant believes that the limitations added to claims 17 and 29 are not taught by Duff.

This argument is not persuasive because as noted above, the added limitation is created due to averaging effects of the frequency divider. (See top of page 7 of Applicant's remarks.) The frequency divider 11k of Duff provides similar averaging effects to those provided by the frequency divider in the instant application, so the frequency divider inherently provides this function regarding the relationship between average switching frequency and relative frequency error; set forth claims 17 and 29.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEVI GANNON whose telephone number is (571)272-7971. The examiner can normally be reached on Monday-Friday 9:30AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG
02/23/09

/Robert Pascal/
Supervisory Patent Examiner, Art Unit 2817